1 PRELIMINARY MARKET CHARACTERIZATION: LOW-INCOME PROGRAMS

1.1 INTRODUCTION

1.1.1 Program Overview

This report summarizes the results of XENERGY's Preliminary Market Characterization (PMC) and Process Evaluation activities for Vermont's two low-income programs: Low Income Single Family (LISF) and the Residential Energy Efficiency Program (REEP), which serves multi-family rental housing. Both programs are part of the core program portfolio administered by the statewide energy efficiency utility, Efficiency Vermont (EVT). EVT officially began operating the core programs in March, 2000.

The single family program is operated in conjunction with Vermont's Weatherization Assistance Program (WAP), through a Memorandum of Understanding with Vermont's Office of Economic Opportunity, the agency that administers the state's Weatherization program, and through sub-contracting agreements with individual Weatherization agencies. EVT sub-contracts with WAP agencies for energy audits, technical assistance and electric efficiency measure installation while WAP staff are providing thermal efficiency measures in the homes of low-income clients. The multi-family REEP program utilizes the services of Weatherization agencies on a project-by-project basis, depending upon project and eligibility requirements, and availability of Weatherization staff. WAP agencies are involved in multi-family projects through a direct contract with the project developer.

While the programs are operated by EVT as independent programs, they share a primary goal: To increase total energy affordability for low-income Vermonters through increased energy efficiency in low-income housing.[1]

1.1.2 Objectives of the Low Income Preliminary Market Characterization

The objectives of this PMC are to:

- Detail the current operations of the EVT low-income programs: target populations, measures and services offered, program organization and management, and funding.
- Develop a set of key research questions to be addressed through the evaluation.

[1] VT DPS: Statewide Energy Efficiency Plan, May 1997

- Identify a set of indicators, both quantitative and qualitative to be used in addressing the key research questions.

XENERGY's approach to this PMC differs substantially from our approach to the Efficient Products Program (EPP) and Residential New Construction program (RNC). The rationale for this change of approach consists of the following elements.

- ***Nature of the programs.*** The EVT Low Income programs differ significantly from the organization's other residential programs in that they do not have as one of their primary objectives the acceleration of market development for energy-efficient goods and services. Rather, EVT's efforts on behalf of low-income electricity customers are cast as social programs with the primary goal of reducing the burdens of high energy costs, unhealthful living conditions, and safety problems experienced by significant numbers of low-income persons. The programs do not operate in an open market. Rather, customers are defined by standards of need; those who do not meet those standards are excluded from participation. Services are provided or contracted for by a closed set of organizations especially established (in part) to carry out the program.

  The evaluation plans and PMCs for the EPP and RNC programs incorporate a market transformation framework. They concentrate on identifying evidence of increased demand for efficient products and services, strengthened delivery channels for those products and services, and causal relationships between program activities and changes in the market. We believe that this framework generally does not apply to the low-income programs.

- ***Guidance from the study sponsors and stakeholders.*** At the kick-off meeting and in subsequent meetings with principals of the low-income programs, XENERGY was clearly instructed to concentrate its efforts on a small number of issues. These included the degree to which program eligibility definitions and outreach procedures capture the population in need of the program and the effectiveness of coordination between EVT and established weatherization service providers. Finally, the sponsors suggested that our efforts concentrate on the single-family program since the REEP program was a continuation with few organizational or design changes of a program that had been administered by Vermont Energy Investment Corporation prior to inception of EVT.

Based on guidance received from sponsors and stakeholders, XENERGY developed the following definitions of broad program objectives on which to focus the low-income program evaluation activities.

- ***Comprehensive targeting.*** Over time, identify and provide services to the largest possible portion of low-income customers who are experiencing difficulties in paying for essential energy services in their homes.
- ***Cost-effectiveness.*** Reduce energy costs (particularly electric costs) to the greatest extent possible given the overall level of funding available to the program. A broad range of program design, operation, and administration issues fall under this objective, including: specification of

qualifying measures, training, quality of materials and installation, cost and usefulness of program and project documentation, effectiveness of coordination between EVT and the Weatherization agencies. This category does not include estimates of actual program savings and costs. This is the objective of a separate evaluation effort. Rather, we focus here on elements of program operation and design that contribute to cost effectiveness.

1.1.3 Research Activities for the Low Income PMC

Research conducted for this Preliminary Market Characterization included interviews with EVT staff responsible for planning and implementation of the LISF and REEP programs; VT Office of Economic Opportunity (OEO) Weatherization Programs Coordinator; and Weatherization Directors and staff from the five agencies throughout the state that administer Weatherization programs. Interview guides were developed with input from EVT, OEO, and VT Department of Public Service (DPS) staff and consultants. The interviews were conducted during late June and July 2000. A list of individuals interviewed is included as Attachment 1-A.

In addition, program research activities included a review of program development and implementation materials, supporting documentation and reports, program databases, and currently available Census data.

Where possible and available, Low Income Market Characterization information was gathered from EVT, OEO, and WAP Agency staff through existing documents. Some potentially useful demographic information on past projects may be available from OEO or WAP program databases by special request.

1.1.4 Structure of this Report

The remainder of this report is structured as follows:

- ***Subsection 2: Low Income Single Family Program Description.*** We provide a more detailed description of the here than in the other two PMCs due to the process focus of the evaluation.
- ***Subsection 3: REEP Program Description***
- ***Subsection 4: Research Questions and Indicators.*** This subsection proposes detailed research questions and associated indicators for the three key program objectives identified above.

1.2 LOW INCOME SINGLE FAMILY PROGRAM (LISF) DESCRIPTION

1.2.1 History and Predecessor Programs

In response to the national energy crisis during the early 1970's, Vermont's Weatherization Assistance Program (WAP) was started in 1976, with funding from the US Department of Energy. Vermont's WAP is administered by the Office of Economic Opportunity (OEO) through a network of five non-profit community service organizations with nine field offices serving different counties throughout the state. WAP offices are usually part of larger Community Action agencies that provide a variety of outreach services to low income clients, including housing assistance, transportation, advocacy, nutrition education and crisis fuel.

In 1990, the Vermont Legislature passed H 832, establishing the Vermont Weatherization Trust Fund. The Trust Fund provides state funding for low-income weatherization activities through a one-half percent gross receipts tax on all non-transportation fuels sold in the state. Annual Trust Fund receipts range from $4.2 - $4.5 million, according to variations in fuel prices. The Trust Fund stabilized the funding, infrastructure and technical capacity of the program and enabled more comprehensive efficiency, health & safety measures to be implemented. It also enabled more training to be provided to WAP staff, and a full-time Statewide Program Coordinator to be hired.

The Weatherization Trust Fund stimulated cooperative programs with electric and gas utilities, by enabling utilities to recover the costs paid to WAP agencies for energy audits and electric efficiency measures installed in customers' homes.

Prior to EVT's LISF program implementation in March 2000, electricity-savings services for low-income single family[2] customers were provided by WAP through a series of individual "piggyback" agreements between OEO and sixteen participating utilities throughout the state. Services provided by WAP included:

- Comprehensive audit and assessment of energy problems;
- Building diagnostics including blower door, carbon monoxide and heating system testing and infrared scans;
- Installation of high-efficiency retrofit measures including attic and wall insulation; air sealing, and heating system upgrades and replacements.

Under these agreements, utilities provided reimbursement to local WAP agencies for installing lighting and domestic hot water electric efficiency measures while they were in the homes of low-income utility customers. A few utilities also reimbursed WAP agencies for administering electric hot water and heating system fuel switching projects.

[2] The WAP and EVT "single-family" program actually serves individuals and families living in both single family homes and 1-4 unit apartment buildings.

Vermont Electric Coop (VEC) and Washington Electric (WEC) chose not to participate in the "statewide" EVT program or a separate program with WAP, and are offering their own low-income programs. Burlington Electric Department (BED) participates through the WAP program, but does not participate in the statewide EVT implementation. BED offers the same programs and incentives as EVT, and has chosen to administer its own programs.

According to information from the OEO Weatherization web site, 32,516 homes were weatherized in Vermont between 1980-2000. This represents 18 percent of all housing units in Vermont in 1990. WAP has continued to expand the scope of services provided and to increase the technical proficiency of staff in the use of diagnostic and remedial techniques and equipment. Ongoing training is considered an important part of optimizing energy savings and energy bill savings for participants. WAP staff are proud of their work and their capabilities.

Impact evaluations of the program are conducted bi-annually. Since 1993, the benefit-to-cost ratio of the program has increased from 1.33 to 2.45 in 1999. As part of the 1999 evaluation, Vermont became the first state to comprehensively quantify the non-energy impacts of weatherization. Results of this effort identified a benefit-to-cost ratio for non-energy benefits of 3.30 to 1. [3] Another bi-annual impact evaluation is planned for 2001.

1.2.2 Program Funding

WAP Funding. WAP activities are funded through an annual grant from DOE, and an annual appropriation from the Weatherization Trust Fund. The current total annual funding level for the Weatherization program is approximately $3.9 million, with about 78 percent of that total allocated from the Trust Fund, and 22 percent from DOE. A substantial increase in DOE funding is anticipated for the year 2002 program. The amount has yet to be decided by Congress, but an increase of 50 to 70 percent over the 2001 allocation of $860,443 has been discussed. WAP's budget covers services provided to both the Single Family Program and the Multi-Family Low-Income Program (REEP), as well as activities performed outside of EVT programs. The DOE Weatherization grant is based on OEO's agreement to provide weatherization services to 900 low-income units throughout Vermont during the one year budget period, April 1, 2001 through March 31, 2002. The 900 unit goal is pro-rated among individual WAP agencies according to a formula based on Census population data.

Eligible uses of program funds. The DOE has established guidelines for expenditures of grant funds, including program administration, staff training, comprehensive audits, advanced building diagnostics, and thermal efficiency measures. By statute, OEO must follow the rules and regulations for expenditure of DOE funds and most activities that Vermont's WAP agencies perform are approved DOE expenditures. The availability and use of Weatherization Trust Funds has allowed WAP agencies the flexibility to add program measures deemed appropriate for the population, including installing smoke and carbon monoxide detectors, electric baseload

[3] Vermont Weatherization Program Overview; OEO website: http://www.ahs.state.vt.us/oeo

measures, fuel conversions and refrigerator replacements. Some of these measures, including refrigerator replacements and electric heat or domestic hot water fuel conversions are now reimbursed under the current LISF program, if they pass EVT screening requirements for cost-effectiveness.

EVT Funding. EVT LISF Budgets for the contract period 2000-2002 are listed below.

EVT Low Income Single Family Budgets

Year 2000	Year 2001	Year 2002	3 Year Total
$406,286*	$730,619	$726,107	$1,863,012

* Year 2000 funding represents a partial year of EVT administration, March – December.

EVT's budget funds program administration, including staff salaries and program incentives. EVT staff includes a part-time Program Manager and part-time assistant Program Manager. The program budget also includes funding for .05 FTE for other EVT staff assistance, and limited technical assistance and training from NETO.

EVT pays WAP subcontractors fixed fees for energy analyses and the installation of electric efficiency measures. The LISF program's Monthly Invoice Summary lists all activities, measures and fees, and is included in this report as Attachment 1-2.

Combined Funding Level. Between the WAP and EVT budgets for 2001, approximately $4.3 million is available for low-income programs throughout the state. The additional DOE allocation in 2002 could amount to more than $5 million available for low-income programs.

1.2.3 Program Administration and Coordination

Framework Memorandum of Understanding. The Low Income Single Family Program, operated by Efficiency Vermont since March 2000, continues to coordinate and "piggyback" its delivery with the existing Weatherization Assistance Program (WAP). EVT and OEO have signed a Memorandum of Understanding (MOU) to provide the framework for coordinating resources for providing services to low-income Vermonters living in single-family homes, or apartment buildings with 2-4 units. Under the MOU, Efficiency Vermont and OEO agreed to develop a single scope of services for statewide delivery. This Scope of Work defines the basic protocol for the initial services and measures to be funded through EVT. New measures and fees may be incorporated into the program through amendments. OEO and EVT negotiated the overall fees that would be paid to WAP sub-grantees for services. EVT then negotiated sub-contracts with the five WAP agencies, with individual goals for each WAP agency based on their contract goals from the OEO/DOE grant agreement. Throughout the negotiations and transition to EVT coordination of the electric programs, EVT staff consulted extensively with OEO and WAP managers on issues of program design, technical methods, and administrative procedures.

Transition program design. Initially, the program included the same implementation process, measures and forms as had been previously implemented through the WAP/Utility Piggyback programs. During the first year of the new program, EVT introduced a number of administrative and procedural changes to aid in the development of a statewide program infrastructure. These included adding the following new measures: electric heat/hot water fuel switching; hardwired light fixtures and refrigerator replacement. Efficient ventilation equipment will be added as a program measure in September 2001.

In some cases, WAP agencies had already been implementing measures that EVT added to the statewide program. SEVCA has had a refrigerator pilot program for the past several years, and protocols similar to SEVCA's were used in the statewide program. Many WAP agencies had administered fuel switch projects, either through the utility piggyback programs or their own emergency heating system replacement programs. Other measures were done by WAP agencies on a case-by-case basis, but are now implemented statewide.

1.2.4 Program Operations

Overall program planning and management. EVT administers the overall program and the five WAP agency sub-contracts. Major planning and development issues are coordinated with OEO and a WAP agency director. The sub-contract goals are based on number of units served (from the DOE/OEO allocations to WAP agencies) and Mwh reductions. A cash Performance Incentive plan provides up to $5,000 per agency for reaching their target goals, with additional incentives for exceeding goals by the end of the program period.

EVT develops forms, procedures and protocols for program activities and measures. Training modules for new measures and procedures are developed and presented to WAP agencies by EVT staff. On a monthly basis, WAP agencies invoice EVT for work completed that month. EVT staff reviews invoices, processes payments to WAP agencies and enters data into the program databases.

WAP resources. WAP staffing levels vary from agency to agency, and usually include office managers, auditors, production coordinators, and installation crews. Five agencies operate nine field offices statewide. As of January 2001, staffing levels included 21 energy auditors and coordinators who directly supervised the work performed on clients' homes by approximately 45 in-house crew persons and a variety of subcontractors. [4] The contracted goals and reimbursement rates for technical assistance, labor and materials from the LISF sub-contracting agreements have stabilized anticipated WAP revenues and enabled two agencies to hire another staff person to administer the EVT program requirements.

Program databases. EVT has developed an Access database to use as a data entry input system for the program. Information from invoices on completed projects by agency is entered into the system.

[4] Vermont Weatherization Program Overview; OEO website: http://www.ahs.state.vt.us/oeo

This data is then uploaded to Efficiency Vermont's state-of the-art Fast Track database, used for tracking and reporting purposes for all EVT programs. LISF data, including measures, savings, and incentives paid are uploaded into Fast Track. Customized data for fuel switch projects is copied and pasted into Fast Track from an Excel spreadsheet. Cost and payment information is downloaded into EVT's MAS 90 Accounting database. From these databases, monthly, quarterly and annual reports on program expenditures and achievements are generated.

WAP has its own statewide Weatherization Data Management System (WDMS) that tracks all staff activities. In the past, this system has provided all the reporting data needed to fulfill their requirements. Some WAP staff view the additional information that they must provide to EVT as doubling the work.

Program Eligibility. WAP currently uses 150% of Federal Poverty Guidelines as a basis for determining eligibility. DOE has approved the use of 60% of Area Median Income as a replacement guideline, and OEO is considering changing to the Area Median Income guideline
Subsidized housing agencies use the HUD-approved guideline of 80% of Area Median Income, so a change by OEO could align eligibility requirements more closely with subsidized housing eligibility.

1.2.5 Program Delivery

Outreach and Marketing. To date, most program participants have come through the normal WAP outreach process, with some referrals from EVT and utilities. Each of the five WAP agencies uses its own methods to identify new clients. These include mailings, referrals from other agencies providing low-income services, newspaper and radio advertisements, and participation in fairs and local events.

Recipients of social services and Low Income Heating Energy Assistance Program (LIHEAP) benefits are automatically qualified for WAP programs. Every few years, OEO receives lists of the approximately 14,000-15,000 LIHEAP recipients, divides the list into WAP territories by housing type and consumption, and distributes the individual lists to each WAP agency for marketing and outreach efforts. These efforts are usually successful in generating some new client activity.

By Vermont statute, LIHEAP recipients are required to participate in Vermont's Weatherization program. There is a check box on the LIHEAP application for applicants to indicate whether they are interested in participating with WAP. There is no "enforcement" of the requirement that LIHEAP participants receive WAP services. Usually, WAP agencies don't need to do much marketing or outreach to reach capacity once the first cold weather of Fall begins.

Application Process. Client applies in person or by mail to the local WAP office. If necessary, WAP staff provides assistance in filling out application. WAP administrative staff checks previous records to see if applicant had received past services. If the applicant has received past WAP services, he or she cannot be served unless the project was completed before the DOE date for revisit. (DOE recently moved the date forward to 9/93). Income verification requests are sent out by WAP administrative staff to one or more of the following, depending on applicant's source of income: employer, Department of

Social Services, Social Security Administration, or other source. Usually, a response is received within 30 days, and applicant is notified of eligibility determination.

Analysis of Consumption. Prior to EVT's operation of LISF, WAP agencies sent a standard form to the client's electric utility to request 3 years of billing history. EVT has access to statewide utility consumption data through its own database, and has designed a streamlined, electronic procedure called Speed Bill for WAP agencies to access this data. The auditor enters the client's name, location, electric utility, and account number on an electronic form and sends it by email to EVT. Auditor also contacts fuel supplier for fuel consumption history. Consumption data is downloaded or received from fuel supplier, entered into an EVT spreadsheet, and is emailed back to EVT.

DISTool. If annual electric consumption is greater than 7000 kWh, client electric usage data is entered into an Excel spreadsheet called the DISTool. This was developed by EVT to disaggregate the consumption into various end uses. It is currently used for high-use or potential heat or hot water fuel switch projects. Using the DISTool, the auditor prepares a preliminary analysis of the major energy improvement recommendations, and includes cost estimates for each recommended measure. The auditor uses the DISTool in conjunction with the State Screening Tool to evaluate cost-effectiveness of the measures. Measures that result in a benefit cost ratio of 1.0 or greater pass screening criteria and are eligible for recommendation to the customer. Measures with benefit cost ratios less than 1.0 fail screening criteria and may not be recommended. For measures that pass screening and will be recommended, the auditor completes a site plan form and a draft specification. All completed DISTool spreadsheets, whether they pass or fail screening, are electronically sent to NETO for technical review. (EVT has contracted with NETO for technical review services). Once the analysis is fully accepted and approved by the technical reviewer, the auditor follows up with the customer, and presents Weatherization measures and EVT measures to the customer at the same time.

Audit Process. Once client eligibility has been established, auditor schedules audit and goes on site to the client's home. If DISTool shows high refrigerator consumption, the refrigerator is metered while the auditor is in the home. The client is interviewed regarding how they use their home, lifestyle patterns, energy/comfort problems, and electric end uses and patterns are identified on the end-use survey sheet. Opportunities for direct install lighting and water efficiency measures are identified, and installed by the auditor at no charge to the client. If lighting fixture replacement is justified, an order form is completed by the auditor and signed by the client. For clients with electric heat and/or hot water, the fuel conversion possibilities are explained and discussed. Audit data and measurements are collected, health and safety checks are performed on all combustion appliances, furnace is cleaned and a blower door test is conducted. After completion of the site visit, the information is entered into an audit software program to develop a detailed work scope, and measures are prioritized according to cost effectiveness and client needs. A WAP installation follows up with installation of measures included in the work scope. A typical work scope usually involves some health and safety work, heating and distribution system efficiency improvements, air sealing and insulation work. These measures are funded through the WAP program.

Client education is continued throughout the audit and installation process by WAP staff to help the clients to understand the process, and how to best operate their home to reduce their energy consumption and costs.

EVT Measures. In general, EVT covers the costs for audits and installation of electric efficiency measures, including technical analysis. Direct Install measures, including compact fluorescent bulbs and electric domestic hot water efficiency measures, are installed by the auditor at the time of the site visit, and billed to EVT on a monthly basis. The Monthly Invoice Summary showing Direct Install measures and reimbursement rates is included as Attachment 1-2. With the exception of compact fluorescent bulbs, which are billed at actual cost, all materials are reimbursed at fixed contract rates.

For Custom measures, including Refrigerator replacement and light fixtures, EVT pays 100% of the cost of the materials. Electric heat and/or domestic hot water fuel switch projects are reimbursed at 75% for materials, with WAP/OEO paying the remaining 25%. Labor costs for Custom measures are paid by EVT according to the Labor Fee Schedule.

Purchase of Installed Equipment and Products. Custom measure products and equipment are specified and purchased by WAP staff. They will try to get three bids from local suppliers for these purchases. Fixtures are purchased by WAP agencies directly from Energy Federation, Incorporated (EFI) through a catalog. Direct install compact fluorescent bulbs and hot water efficiency measures are purchased by individual agencies through their established suppliers. Costs, which vary, especially for CFL's, are reimbursed by EVT. EVT and WAP agencies are involved in discussions about the possibility of standardizing these costs. WAP agencies are mixed in their response to standardizing costs through bulk purchase from catalog suppliers. Some have had bad experience with certain manufacturers of lower cost materials, and are not willing to sacrifice the quality of materials to get the lowest price. Another concern is availability of products in a timely manner from catalog or other bulk suppliers. They have experienced backlogs and waiting periods for certain lighting fixtures from EFI.

Quality Control. Upon completion of each WAP project, a quality control inspection is performed by the local WAP agency. OEO routinely monitors local agencies for proper administrative oversight, and an OEO Weatherization Technician inspects 10% of completed jobs to ensure that the completed work meets quality standards. Currently, EVT does not conduct follow-up inspections, but is planning to develop a sample inspection process for EVT-funded installations.

Billing Process. Agencies invoice EVT on a monthly basis for work completed during the billing month. For each client visit, the following billing forms are included:

- Direct Install Lighting and Prescriptive Measures Worksheet – details various fees for technical analysis and Direct Install Measures.
- A Contract Management Worksheet, detailing the associated costs for technical analysis and installation of Custom Measures (fuel switching, refrigerator replacement, light fixtures) for that client.

- A copy of the Lighting Fixture Order & Installation Verification Form and EFI Invoice.
- Copy of the final version of the DISTool for fuel switch projects.
- Copies of job specifications and invoices for each major measure.

From the individual client worksheets, a Monthly Invoice Summary is prepared by WAP, providing a listing of all EVT-related costs paid or incurred during the month by WAP. This summary and all the supporting individual documentation listed above are submitted for payment to EVT.

1.3 RESIDENTIAL ENERGY EFFICIENCY PROGRAM (REEP) MULTI-FAMILY PROGRAM

1.3.1 Background and Predecessor Programs

In 1996, Vermont's Department of Public Service was awarded a $115,000 Rebuild America grant from US DOE to support the development of a multi-faceted program to provide comprehensive energy efficiency services in low-income multi-family housing. The Rebuild America proposal was developed through a partnership of the DPS, OEO, several Vermont utilities and housing agencies. In February 1997, Vermont Energy Investment Corporation (VEIC) was selected as a contractor by the DPS to develop the program under the administration and oversight of the Office of Economic Opportunity (OEO). During the following year, the REEP program was developed and existing utility-sponsored low-income multi family programs were transitioned into the REEP.

By 1999, when VEIC was awarded the contract to develop and administer the statewide energy efficiency utility, Efficiency Vermont (EVT), the REEP program had already been operating for more than a year, and had several projects underway. The transition was fairly smooth, and involved administrative changes that were relatively transparent to participants. Instead of OEO administering and overseeing the program, the (EVT) REEP program was under VEIC's administration, with oversight by the DPS.

REEP provides comprehensive energy services to reduce energy use and costs in low-income multi-family housing. In both market-driven and retrofit projects, REEP works with owners of subsidized and non-subsidized housing to provide a combination of detailed technical assistance and customized financial incentives to leverage investments in electrical and fossil fuel efficiency. Where possible, REEP coordinates with Vermont's WAP program and Vermont Gas Systems to leverage resources and provide customers with a comprehensive package of efficiency services.

A Process Evaluation of REEP was conducted by Peregrine Energy Group in early 1999, after almost two years of operation, before EVT began operating Core programs. The Evaluation found REEP to be "extraordinarily successful in implementing the program with property owners and managers in subsidized housing, and with private for-profit and non-profit entities rehabilitating low income

subsidized housing." The evaluation also found that "REEP's (one stop shopping) packaging approach is a key element of the program's success. The combination of utility incentives, Vermont weatherization services/investments and owner contributions assembled in the packages provides the resources to move from comprehensive implementation." Several of the specific recommendations from the evaluation report have been implemented as a result of a transition to a statewide efficiency utility operation of the program, including using one screening tool instead of individual utility tools, and eliminating the allocation of project resources according to utility contribution and service territory. Other issues have been specifically addressed by EVT, or are in the planning stages, including hiring additional staff, providing program-related training for architecture and engineering firm design professionals, and a targeted program for non-subsidized housing owners. A few recommendations regarding eligibility criteria and REEP/WAP coordination have apparently not been fully resolved and these issues were mentioned during interviews conducted for this report.

- ***Income eligibility differences.*** The earlier report recommended changing the income eligibility standard in the Weatherization Trust Fund authorizing legislation to a standard based on HUD's median area income standards. This would resolve income eligibility differences between REEP and WAP. DOE has authorized the use of (60) percent of median standard to more closely align with HUD's standard (80% of area median income).

- ***WAP staff uncertainty about policies related to participating in REEP New Construction projects***. The recommendation from the first evaluation encouraged OEO to disseminate decisions and policies about WAP participation and eligibility requirements more clearly to all WAP agencies through its letter series. (Letter series are OEO's method of transmitting information to WAP agencies regarding new policies

- and procedures.) According to EVT REEP staff, WAP agencies had differing understandings of eligibility requirements for their participation in new construction projects.

1.3.2 Program Funding

REEP began in 1997, with seed funding of $115,000 from DOE and per-project incentives provided by participating utilities for projects in their service territories. A transition to complete VEIC operation of the program occurred in 1998, with participating utilities contributing an amount approximately equal to their most recent years' Low Income Multi-Family program budgets during 1998 and 1999. Starting in 2000, the program was funded as part of the statewide efficiency utility charge on ratepayers' bills.

Since the beginning in 1997, OEO has contributed a substantial amount of program resources through the provision of WAP services and incentives. Vermont Gas Systems (VGS) has also provided incentives for projects that increase gas use efficiency in their customers' facilities.

Building owners contribute a significant portion of the costs of improvements made through the REEP program.. According to Efficiency Vermont's 2000 Annual Report, over $1.1 million in energy improvements were made to Vermont's affordable housing stock, with nearly 70% of the improvement costs paid by project and building owners. Table 1 shows REEP's basic operating results, funding sources and expenditures for the period 1997-2001. Over its first four years the program served 2,766 units. To provide a sense of scale, there were 24,118 housing units in structures with 5 or more units in Vermont at the time of the 1990 Census. Analyses contained in the DPS's 1997 *Statewide Energy Efficiency Plan* estimate that roughly 10,600 low income households live in structures with five or more units. Thus, the program has reached roughly 10 percent of all multi-family units in the state, and roughly one-quarter of eligible units.

Table 1-1-1
REEP Operating Results, Budgets, Expenditures

Year	Units Served	Annual MWh Savings (Estimated)	REEP Incentives	WAP & VGS Incentives	Participant Costs	Program Budget	Program Expenditures
1997	449	412	$ 57,256	$ 17,899	$131,461	n/a	$161,760
1998	712	1815	$165,074	$168,243	$756,683	$ 681,322	$577,573
1999	759	1655	$229,045	$134,493	$655,092	$ 776,217	$512,997
2000	846	2159	$303,431	$ 57,530	$767,757	$ 790,370	$735,942
2001	n/a	n/a	$534,500	n/a	n/a	$1,214,841	n/a

Program staffing. REEP budgets fund program administration and implementation costs, including incentives to participants. The program has 6 project managers, a half-time administrator, and another person at 20%, doing customer intake.

1.3.3 Coordination with WAP

Transition oversight. During the early years of REEP, the program was administered by OEO, and operated by VEIC, under contract with OEO. During the transition to full implementation of programs by the efficiency utility, an advisory group of utilities and other public agencies provided guidance and input. Under the EVT, OEO no longer has an oversight or administrative role.

REEP coordinates on a project-by-project basis with WAP agencies. The coordination is not consistent across all REEP project managers and across all WAP agencies. Most WAP respondents agree that REEP rehab work has been good for WAP – it allows them to capture more units than the single family program, and that the concept of "one stop shopping" is good.

REEP usually verifies income for eligibility. REEP and WAP income eligibility criteria are not the same. Therefore, WAP often verifies the income of tenants itself. The application of different eligibility criteria involves more work in verification.

1.3.4 Program Operation

Project development process. REEP provides a "one stop shopping" approach to comprehensive energy improvements in low-income multi-family housing. REEP serves all types of projects in this market, including new construction, major rehabilitation or renovation, and discretionary comprehensive retrofit projects. Services include:

- Energy analysis of the property;
- Evaluation and recommendation of cost-effective energy improvements;
- Assistance in locating and obtaining financing for the improvements;
- Referrals to contractors;
- Construction management services; and
- Administration of project-based financial incentives.

The steps in the development of a typical project are as follows.

- ***Energy Audit.*** As a first step in the energy audit process, REEP project managers obtain utility and fuel use data and analyze it to develop a sense of project scale and possibilities. Next, REEP conducts an on-site audit visit. Based on the results of the visit and the energy use analysis, REEP prepares a report identifying recommended measures, with rough estimates of measure costs, savings and incentives.
- ***Setting Incentives.*** REEP incentive amounts are based on estimated electric savings. EVT uses an "internal prescriptive level" for incentives as a starting point in negotiations with owners. All custom measures are screened, using the DPS screening tool, and an incentive package is

developed. REEP managers have some flexibility with incentives and screening so long as the overall package is cost-effective once owner contributions are taken into account. REEP stresses comprehensive projects and presents the project as a package, generally not allowing the owner to "pick and choose" among measures.

- ***Construction Management.*** Bids are prepared by REEP, if necessary, and bid process conducted. Or, REEP reviews sole source estimates for owner. REEP summarizes bids for the owner and helps select contractors for various elements of the improvements. REEP monitors the project as measures are installed and works with tenants if necessary.
- ***Direct installs/WAP Agency Role.*** EVT's first choice for direct installation projects is the local WAP agency, especially if its crews are already on-site for other projects. Direct install often done by facility maintenance staff/managers.
- ***Arranging for financing.*** If the owner needs help with financing, REEP helps to identify financing and prepare documentation.
- ***Inspection and quality control.*** REEP staff conducts a final inspection for quality installation and materials after project is complete. After this inspection, the REEP Project Manager conducts an additional inspection to ensure that the "as built" project corresponds to the measures specified in the contract with the owner. Once the project passes this inspection, the EVT project manager authorizes release of the incentive check to the owner.

1.4 RESEARCH QUESTIONS AND INDICATORS

1.4.1 Comprehensive Targeting

Research questions. The income-eligibility requirements used in the various low-income energy and fuel programs can be viewed as a proxy measure of the likelihood that eligible customers cannot afford to pay for essential energy services (heat, hot water, light, basic appliances) and for the rest of life's necessities at the same time. The key research questions in regard to comprehensive outreach are as follows:

- What percent of low-income customers who experience energy affordability problems are captured by the current eligibility criteria for participation in the EVT low-income programs? Are there groups of customers with affordability issues -- defined by age, location, type of housing, or other attributes – that are systematically (if unintentionally) excluded from participation due to the eligibility definitions?
- To what extent do current outreach methods identify customers who are experiencing energy affordability problems but who do not qualify for the programs?
- What percent of customers who *are* eligible are identified via current outreach methods?

In the following paragraphs we assemble information from a variety of sources that will be useful in addressing the research questions above.

Indicators of affordability. Researchers in the field have found that developing quantitative indicators of energy affordability at the individual customer level presents formidable problems. There are two basic types of affordability indices.

- ***Measures of burden.*** Measures of burden proceed from an intuitively simple principle: The more energy costs in terms of a household's income, the less it will have for other necessities. Thus, the ratio of annual energy (or electric) bills to annual income should be a good measure of affordability. Unfortunately, it has been very difficult to implement meaningful measurement of electricity burden in a manner that supports consistent treatment of families in different circumstances.[5] Among the major difficulties involved are accounting for a wide array of subsidies and entitlements; accounting for various forms of undocumented and in-kind income; change over time in household composition; and variations in expenditure patterns among different kinds of households. For example, a two person-household consisting of a single parent and child has very different consumption and expenditure patterns from a two-person household consisting of an elderly husband and wife. The result is that there is relatively little correlation at the individual household level between measures of burden and behavioral indices of burden, such as service cutoffs and levels of arrears. [6]
- ***Behavioral measures.*** Perhaps the cleanest and simplest measure of affordability problems at the individual household level is experience of service cut-offs or notice of termination. Generally customers can remember if they have had service terminated, although many might feel inhibited about reporting the experience in a survey. Change in arrears is even better in that it captures finer gradations among customers. However, the kind of billing analysis needed to estimate changes in arrears over time for samples of individual customers is extremely labor-intensive and expensive.

Whatever the shortcomings of burden and behavior indicators, the two basic approaches will need to be used in developing measures to address questions concerning the comprehensiveness of low-income program marketing and delivery. Potential approaches to developing these measures include the following:

- Analyze a sample of program intake records to develop estimates of energy burden prior to participation in the program.
- Conduct a survey of a larger number of program participants than originally proposed, including questions on experience of late bill payment, notice of termination, and termination for non-payment.

[5] For documentation of these difficulties, see the more than 50 technical papers collected by the Bureau of the Census on its Household Expenditure Survey web page: www.census.gov.hhes/pov/povmeas

[6] Personal communications with David Carroll, Roper Starch International, principal investigator and project manager for the Residential Energy Consumption Survey.

Policy in regard to comprehensiveness of targeting. Beyond the technical development of affordability measures lies a policy question of the substantive formulation of goals in regard to targeting. Clearly, the funding limitations on the program are such that not all households in need can be served in the evaluation time frame. Similarly, it would be difficult to identify *a priori* classes of potential participants whose needs are more urgent or legitimate than others that fall within the eligibility criteria. Given these considerations, the performance criterion could be stated as follows: All participants in the EVT low-income programs should belong to eligible groups of customers, however those groups are defined. The key question for program operation and evaluation support then becomes how to set eligibility criteria so that they capture the population of customers defined as "in need of program services." At a finer level, the policy goal could specify some mix of customer groups to be served. The program design challenge would then be to formulate some practical, non-discriminatory set of procedures to capture the preferred mix.

Description of Vermont's Low-Income population. United States Census data provide the best descriptive statistics on the number, location, demographic characteristics, and housing situations of low-income persons and families. Unfortunately, these detailed data series are not yet available at the state level for the 2000 Census. The tables below summarize results of the 1990 Census regarding the distribution of Vermont's low-income population along a few key variables.

Number of low-income persons and families.. Approximately 10% of Vermont's residents were considered to be at Poverty Level at the time of the 1990 Census. Census poverty information is difficult to compare with other measures of poverty level, since the Census uses a very complex procedure to develop a standardized estimate of poverty among several different measures used in various federal programs. Table 1-2 shows the 1989 figures for families and individuals over age 65 living at Poverty Level in Vermont.

Table 1-2
Number of Families and Individuals over Age 65
Living at Poverty Level in VT, 1989

	Persons	Families	Persons over 65
Total Population	541,372	145,721	61,726
Total Poverty Level	53,369	10,104	7,637
% Poverty Level	9.9%	6.9%	12.3%

Source: 1990 Census Data

Table 1-3 shows the number of Vermont households with income less than $15,000, and the number receiving receive Public Assistance.

Table 1-3
Vermont Households with Incomes Less than $15,000
and Receiving Public Assistance: 1989

	Total Number	Percent
VT Households	210,633	100 %
Households with Income less than $15,000	47,207	22%
Households Receiving Public Assistance	15,068	7.2

Source: 1990 Census Data

Number and type of housing units occupied by low income households. In 1997, the Vermont Department of Public Service (DPS) estimated that about 38,000 Vermont households, in both single- and multi-family housing, had household incomes that were less than 150% of Federal Poverty Guidelines. Their estimate of the approximate distribution is shown in Table 1-4.

Table 1-4
Distribution of Low-Income Housing in Vermont

Units in Structure	Low-Income Households	Low-Income Buildings
1 (detached)	7,808	7.808
1 (attached)	535	535
2	3,948	1,974
3-4	4,787	684
5-9	4,957	467
10-19	2,354	126
20-49	1,753	45
50+	1,540	24
Mobile home	10,189	10,189
Other	433	162
Total	38,303	22,015

Source: Vermont Department of Public Service Statewide Energy Efficiency Plan

Geographic distribution of low-income families. Table 1-5 shows the distribution of all Vermont families and all families classified as being in poverty. The table shows that the population of low-income families is distributed throughout Vermont's counties in pretty much the same proportion as the population. This count omits individuals living alone or in group quarters.

Table 1-5
Distribution of Vermont Families and
Families in Poverty by County, 1989

	Total Families	% of all VT Families	Families in Poverty	% of VT Families in Poverty	% of County Families in Poverty
Addison County	8,332	5.7%	842	6.6%	10.1%
Bennington County	9,611	6.6%	727	5.7%	7.6%
Caledonia County	7,431	5.1%	543	4.2%	7.3%
Chittenden County	31,603	21.7%	3,274	25.5%	10.4%
Essex County	1,750	1.2%	140	1.1%	8.0%
Franklin County	10,805	7.4%	995	7.8%	9.2%
Grand Isle County	1,478	1.0%	145	1.1%	9.8%
Lamoille County	4,948	3.4%	486	3.8%	9.8%
Orange County	7,050	4.8%	593	4.6%	8.4%
Orleans County	6,541	4.5%	479	3.7%	7.3%
Rutland County	16,341	11.2%	1,360	10.6%	8.3%
Washington County	14,081	9.7%	1,227	9.6%	8.7%
Windham County	10,943	7.5%	900	7.0%	8.2%
Windsor County	14,807	10.2%	1,109	8.7%	7.5%
Total	145,721	100.0%	12,820	100.0%	8.8%

As part of the evaluation, these tables will be updated and expanded to reflect 2000 Census information, and to provide a basis for estimating measures of energy burden.

Program eligibility criteria in the context of poverty measures. Currently, the various agencies that administer energy programs for low-income customers in Vermont use different eligibility standards. WAP currently uses 150 percent of Federal Poverty Guidelines as a basis for determining eligibility. Low Income housing programs and EVT's Low-Income Multi-Family Program (REEP) use a percentage of Area Median Income guideline. The federal HUD program and REEP use 80 percent of Area Median Income as a qualifier. Area Median Incomes are developed on a county-by-county basis.

DOE has approved the use of 60 percent of Area Median Income as a replacement guideline for WAP, and OEO is considering changing to the Area Median Income guideline. Subsidized housing agencies use the HUD-approved guideline of 80% of Area Median Income, so a change by OEO could align eligibility requirements more closely with multi-family housing eligibility.

Compared to the HUD Guideline (80 percent of Area Median), WAP guidelines are much more stringent. EVT's REEP staff compared the two guidelines in a chart showing the overlap of various

income eligibility ceilings for 1 to 8 person households using both metrics. This chart shows that one-person households (and two person households in Windsor and Washington counties) need to be at or below 30% of Area Median Income to qualify for WAP services. Two- and three- person households in most counties must be at or below 50% of Area Median to meet the equivalent WAP eligibility. A change by in eligibility criteria for WAP, to 60% of Area Median, approved by DOE and currently under consideration by OEO, could resolve much of the eligibility disparity for smaller households.

If the applicant receives social services, Fuel Assistance, or assistance from certain other federal or state programs, they are automatically qualified for WAP services. This practice adds further variety and some "head room" in terms of eligibility for the program.

Other eligibility criteria: previous participation in WAP. Once a WAP project has been completed and closed, DOE rules and regulations prohibit WAP from providing additional weatherization services before a specified future date. Every few years, DOE moves the date ahead. Earlier in 2001, DOE revised the date to September 1993. Any client served before that date can be revisited by WAP to assess the potential for additional measures, or measures that have been introduced since the client's project had been completed.

Since WAP agencies maintain all files, it could be possible to review closed out files to identify new opportunities. Some agencies routinely do this during occasional slow periods during the spring and summer months.

Small rental units. Small buildings with from one to three units are served under the LISF. Traditionally, these small units have qualified for WAP services. It has always been a challenging market to serve, because of the difficulty in securing landlord participation and investment. WAP has developed a flexible approach to the requirement that landlords contribute to the cost of the project, and will consider a number of landlord improvements as "in-kind" contributions. WAP had also offered loans to rental property owners for their share of project costs, through a Revolving Loan fund, allocated from the Weatherization Trust Fund. The availability of loan funds was apparently not incentive enough for landlords to commit to energy efficiency investments, and the fund has been discontinued.

Program staff comments on eligibility/comprehensiveness of service delivery. As part of the interview process, respondents were asked if they thought eligibility limits should be extended, and if so, which guideline they thought should be used. Most respondents indicated that eligibility limits should be extended to capture at least some percentage of the "working poor" that are employed, but cannot meet their obligations and needs. One WAP Director speculated that an equal number of applicants are turned away each year due to ineligibility as are served. They served approximately 225 clients during the past year. Another group that is often excluded by a very small margin is retirees. Often, a modest pension will cause these individuals to be slightly over income. Since WAP includes retirement income in their eligibility formula, this is a recurring issue. Another WAP Director estimated that 10-15% of all applicants are determined to be ineligible by a very small margin, often by just a few hundred dollars.

While some favored increasing eligibility to 185% or 200% of Federal Poverty Guidelines, more respondents indicated that the eligibility limits should be defined as a percentage of Area Median Income, to make coordination with housing groups and REEP easier. One Director, who supports an increase to 200% of FPG, estimated that 20-25% more households (50-60) would become eligible in his agency service area under that guideline.

REEP eligibility. REEP projects are income-qualified based on project subsidy requirements, individual resident incomes, or rent levels. At least 50% of tenants must qualify in order to provide REEP services to the entire facility. If the facility receives state or federal housing subsidies, it is automatically qualified for REEP services. In a mixed income facility, individual resident incomes are determined, often by WAP through their normal eligibility verification process. REEP also uses a rent level approach to determining eligibility. If at least half of the units in a facility have rent levels that are no more than 30% of 80% of area median income, then the entire facility is eligible for services under REEP.

Like small rental units, non-subsidized rental properties with 5 or more units are hard to reach through energy efficiency programs. These "mom and pop" properties are scattered throughout the state, and are difficult to identify and locate. Once identified, the landlord must agree to participate and contribute to project costs.

REEP has developed a pilot project to be implemented in the Rutland area with assistance from the local WAP agency. The pilot will focus on apartments with electric baseboard heating, and will use rent levels to determine eligibility. Monthly rents for the units must be no more than 30% of 80% of the area median income to qualify. REEP will provide a 25% cash incentive towards the owner's cost of switching to non-electric heating system(s). REEP plans to work with the property owner to restructure rent levels so that tenants pay more in rent, but no longer pay for heat in their electric bills. Project incentives will be individually negotiated and will be structured to result in a positive cash flow for the property owner and the tenants.

REEP staff acknowledges that identifying eligible buildings and owners could be difficult. Unlike subsidized multi-family properties, there are no obvious listings of the buildings that could be eligible for the program. Networking to local property owners through local sources will be key to the potential success of the program.

1.4.2 Effectiveness

A broad range of program design, operation, and administration issues fall under this objective, including: specification of qualifying measures, training, quality of materials and installation, cost and usefulness of program and project documentation.

Program Design

The key research questions in regard to program design and its impact on cost-effectiveness are as follows.

- *Are all energy efficiency measures that are likely to be cost-effective included for potential specification in the program?*
- *Do the methods for screening the cost-effectiveness at the household level work appropriately to ensure that factors affecting cost-effectiveness are accounted for*?

The following paragraphs summarize findings from the preliminary interviews on the topics identified above.

Program Measures / Screening – LISF. In the Low Income Single Family Program (LISF), DOE funding enables WAP to provide state of the art building diagnostics and a comprehensive package of thermal efficiency measures, including air sealing, insulation and heating system improvements. Program funding through the Weatherization Trust Fund provides WAP with additional flexibility to install basic health and safety measures including smoke and carbon monoxide detectors, and more expansive efficiency measures such as heating systems and refrigerator replacements. WAP uses blower door testing, and performs a benefit/cost analysis using the Market Manager screening tool for each potential measure, to prioritize measures to be installed in each home. WAP is planning to change to the DOE NEAT screening tool this summer. Although there is no official cap on expenditure per home, WAP agencies use a cap of $3,200 - $3,500 per job as a guideline. Agencies report that this amount is sufficient to enable WAP to substantially improve the thermal efficiency of the home. It does not cover repairs, wiring or other additional work that might be required. WAP has limited funds available for this work. With approval from OEO, up to $4,500 can be spent on a home for additional efficiency measures if necessary. WAP also has a separate pool of approximately $20,000 allocated from the Trust Fund, to provide heating system replacements during the period from April to November, when the Crisis Fuel program is not operational.

Several WAP agencies identified a strong need for a source of funding for repairs and other incidental work that must be completed before WAP can provide thermal measures. One Director estimated that 10% of the homes they see are seriously rundown, and cannot be served under WAP until basic repairs are completed.

EVT now provides reimbursement for WAP technical assistance and installation costs for funding of electric efficiency measures. Initially, the program included the same implementation process, measures and forms as had been previously implemented through the WAP/Utility Piggyback programs. During the first year of the new program, a number of administrative and procedural changes were introduced by EVT to aid in the development of a statewide program infrastructure. Several new measures were added to the program by EVT during the first year of operation, including electric heat/hot water fuel switching; hardwired light fixtures and refrigerator replacement. Efficient ventilation equipment will be added as a program measure in September 2001.

For each new measure that is introduced, EVT performs a detailed cost-benefit analysis, identifies and develops data tracking points and procedures, and develops a program database. "Prescriptive measures" such as lighting and hot water efficiency measures are screened on a program basis by EVT and if simple guidelines are met (e.g., electric hot water heating system is present), the measures can be directly installed by WAP auditors while they are in the home. "Custom" measures, including electric heat and/or hot water fuel switch projects and refrigerator replacements are screened individually using the statewide screening tool. In addition, for new measures, EVT develops protocols, forms and administrative procedures for WAP implementation. Technical and administrative training is provided to all WAP agencies before the new activity or measure is officially incorporated into the program.

Program Measures / Screening – REEP. REEP provides a "one-stop shopping" approach for energy efficiency projects in multi-family rental housing. Services provided by REEP include comprehensive technical and administrative project assistance and custom project-based incentives for new construction, major rehabilitation and comprehensive retrofit projects. REEP's comprehensive approach includes all societally cost-effective measures as recommendations, including potentially, efficient lighting and mechanical ventilation measures, refrigerator replacement, and water saving measures. Cost-effective air sealing and insulation are also included in the project. Where possible, WAP performs this work and "direct install" lighting and hot water efficiency measures in REEP projects.

All REEP measures are screened for cost-effectiveness using the statewide screening tool. The screening tool has been modified several times. Direct install prescriptive measures are screened at the program level, and all other potential REEP custom measures are individually screened. REEP has some flexibility to assign measures that may not screen well to owner funds or other sources of funds, and thereby maintain project comprehensiveness.

Opportunity for additional measures. During the interview process, participants were asked if they had any suggestions for additional measures that would be beneficial to their clients and could complement existing program activities. The following recommendations were made by WAP staff:

- Energy efficient freezers – Many low-income homes have inefficient freezers, especially in rural areas that are not in close proximity to supermarkets.

- Cook stove switch from electric to gas, possibly packaged with a domestic hot water fuel switch project (if propane is brought in for the new system). Or, a new gas stove if existing gas stove is producing high Carbon Monoxide levels.
- Replace inefficient appliances, especially microwave ovens. According to WAP staff, almost every home has a microwave now.
- Water pumps – if metered results show spikes in bills.

Conclusions. XENERGY's general observation on the roster qualifying measures, the means by which alternatives or additional measures are screened, and funding for accompanying repairs suggests that this particular piece supports comprehensive and flexible treatment of homes that come into the program. One outstanding issue appears to be availability of funding for ancillary repairs. This issue will be tracked in the process evaluation, with particular attention to the number of eligible houses that are rejected for treatment due to need for repair.

Program Operations

The key research questions in regard to program operations and their impact on cost-effectiveness are as follows.

- *Do project documentation procedures contribute to quality assurance as well as management control of program outreach and delivery?*
- *What are the costs of program documentation? Are they appropriate in light of their contribution to program quality and energy savings?*
- *Are the activities of the various agencies involved in funding and delivering LISF services sufficiently well-coordinated to make best use of resources available to the program?*

Program documentation development. For the LISF, EVT develops forms, procedures and protocols for program activities and measures. Training modules for new measures and procedures are developed and presented to WAP agencies by EVT staff. On a monthly basis, WAP agencies invoice EVT for work completed that month. EVT staff reviews invoices, processes payments to WAP agencies and enters data into the program databases.

LISF Billing Process. During the preliminary interviews, WAP staff complained about the extra burden of paperwork imposed by the EVT program. Those who commented felt that the paperwork was redundant, and could be streamlined. One respondent commented that "each new measure added four more forms to the increasing pile".

Interview comments regarding coordination. During the interview process as part of the preliminary evaluation activities, respondents agreed that the broader program scope and focus on new electrical efficiency measures is good for the program, and can be very helpful in reducing the utility bills of low-income participants. In many cases, their electric bills exceed heating bills.

There were a number of comments regarding program coordination, and a general agreement that there is room for improvement. While they acknowledged that the development and implementation process for any new initiative requires many changes and a period of "debugging" to reach a plateau of smooth operation, many WAP respondents indicated that the transition and the addition of new processes and administration has been difficult and burdensome. Each new measure or activity has required one or more amendments to the sub-contracting agreement, and a change in reporting forms, often with new forms and procedures for implementation added. New protocols, installation techniques and reporting requirements for each measure must be learned. One agency WAP director commented that the EVT "paperwork" requirements have added 3 hours to the Audit process, and 5-6 hours to the administrative monthly reporting process. Another respondent recommended that paperwork be "streamlined" to avoid the duplication of information on various forms.

With the anticipated income from EVT activities, two agencies have been able to hire new staff to assist in administering EVT program requirements. Agency directors indicate that this has worked well to alleviate the extra work required of existing audit and administrative staff. Agencies that have not hired staff to assist with EVT program requirements have suggested that the program would be well-served by funding an additional WAP staff person for EVT-related activities, including the following:

- Survey of consumption/usage – used by auditors to interview clients regarding their usage of various electric appliances.
- Speed Bill process – involves sending new client information to EVT, including utility account information, to enable EVT to generate utility consumption data. This process is done electronically, through an email attachment.
- Disaggregate Tool – this is completed by the auditor in the case of high-use or fuel switch candidates. (This tool was the target for many WAP staff comments during the interview process. Comments focused on the amount of time necessary to prepare a "disag", many modifications to the tool, and the tool's user un-friendliness).
- Packaging and placing orders for lighting fixtures, heat wrap, bulbs, and follow up with suppliers.
- Refrigeration screening, ordering, follow-up.
- Ventilation screening, ordering, follow-up.

EVT's comments regarding the issue of coordination included the suggestion to have regularly scheduled meetings between EVT, OEO and the WAP agency directors. This group has met on occasion to discuss issues and problems related to the coordination of services. EVT would also like to see more standardization among WAP agencies with regard to purchase of materials, agency performance and

services offered. From EVT's perspective, WAP agencies are paid the same fees for services, but the service delivery is not consistent. Also, WAP agencies purchase light bulbs and some hot water efficiency equipment from different suppliers, and prices vary considerably. EVT would like to see a more standardized purchasing arrangement, or a fixed price reimbursement based on the available low price for equipment that meets quality standards.

REEP coordination and management issues. During interviews, WAP directors had numerous comments about coordination issues with REEP. Out of the five agencies interviewed, two had many complaints, one had just one complaint, and one refuses to participate in REEP. Areas identified by WAP administrators as needing improvement included:

- Consistency in seeking and scheduling WAP involvement in REEP projects.
- Consistency in development of scopes of work for WAP work on NEEP projects.
- Coordination of multiple contractors on REEP jobs.

1.4.3 Evaluation Indicators

Table 1-6 identifies indicators and data sources to be used in addressing the research questions discussed above. Further detail will be added to the table in preparation for implementation of the next round of evaluation. XENERGY will also hold discussions with OEO regarding the proper formulation of evaluation criteria for comprehensiveness of program targeting.

Table 1-6

Indicators for Low-Income Program Evaluations

Research Question	Indicators	Sources
Comprehensive Targeting • Operational definition of energy affordability. • Other operational definitions of program need: poor condition of energy-related construction elements, heating and hot water systems. • Do current program guidelines capture a high percentage customers in need, as defined by affordability, housing condition criteria>	• Average percent of income paid for electricity; other energy, by group defined by demographic, housing, location variables. • Percent of low-income households with bad shell and HVAC system conditions. • Percent of groups defined by need who are served by the program.	• US Census. • WAP agency, OEO and EVT program records.
Cost Effectiveness • Comprehensiveness of measures. • Appropriateness of screening methods.	• Judgment of independent technicians regarding list of measures and screening approach.	• XENERGY review. • Review by independent experts with experience in the Vermont market.
• Effectiveness of project documentation and tracking systems	• Estimates of cost of the tracking system: hours of labor, materials, data processing. • Data and fields identified for assuring quality and compliance with program design. • Number and type of documentation items identified that do *not* contribute to quality and compliance.	• Interviews with program staff. • Review of program budgets. • Interviews with WAP staff.